

REMARKS

The Office action of October 14, 2003 has been carefully considered and the application has been amended accordingly.

Claims 48 and 50-67 are present in the application. Claim 48 has been amended, claim 49 has been cancelled, and claims 53 and 54 have been amended to correct minor errors.

The examiner is objecting that the present invention either lacks novelty or inventive step with respect to Kieser *et al.* (US 5,746,051).

Amended claim 48, and the claims depending therefrom, clearly differentiate the present invention from that disclosed in Kieser *et al.* As amended, applicant's claims require that the pair of electrodes are embedded in the dielectric material. In contrast, Kieser *et al.* use plates of dielectric material which may or may not be bonded to the electrodes. However, nowhere in the Kieser *et al.* patent is it suggested that two or more electrodes are embedded in a single piece of dielectric material as is now required by the present claims. Accordingly, the present invention is novel with respect to the disclosure of the Kieser *et al.* patent.

In operation of the reactors disclosed in the Kieser patent, certain problems would arise. The Kieser patent shows reactors (for example in Figure 2) which use individual plates of dielectric material such as aluminum oxide (column 3 line 43). The combination of the high voltages and temperatures under which the reactor operates lead to thermal and high voltage stresses in the dielectric plates and cause the plates to break. In addition,

typically problems arise in sealing the plates and the electrodes to the outer insulating material (60, 61 in Figure 2). During operation of the reactor the pressure of the exhaust gas will find any cracks between the dielectric plates or the electrodes and arcing will also then occur between the plates along any of these gaps.

Applicant realized that these problems occur through their work in constructing reactors. However, there is nothing in the Kieser et al. patent to suggest that the reactors disclosed in the patent suffer from these problems. Even if one of ordinary skill in the art realized that there are problems in sealing the ends of the dielectric plates in the Kieser et al. patent or that the plates suffer from thermal and/or high voltage stresses this would not lead them towards the present invention. One of ordinary skill in the art would try to solve such problems by adding more sealant around the ends of the plates or using an alternative sealant. In order to reduce the thermal or voltage stresses, one of ordinary skill in the art would try using a thicker dielectric plate which could cope with higher stresses.

Instead, applicant realized that these problems can be solved by providing a single piece of dielectric material in which the electrodes are embedded and within which there are gaps to form the gas channels. This required an inventive leap.

Plates of dielectric material are readily available and are easy to produce (they are typically made by forming a slurry of the desired dielectric material which is then spread on a flat surface and dried to form a plate). To form a single piece dielectric in which electrodes may be embedded, dielectric

material is typically extruded and this is a considerably more complex procedure. It would not be obvious to one of ordinary skill in the art to whom plates of dielectric material are available to change from using plates to using a single complicated shaped piece of dielectric material containing gas channels and in which the electrodes are embedded. Indeed, one of ordinary skill in the art would be far more likely to change or increase the amount of sealant or use a thicker plate as explained above. Such a problem would not prompt one of ordinary skill in the art to redesign the entire reactor.

The present reactor also has further advantages due to using a piece of dielectric material in which the electrodes are embedded. As shown in Figure 1 of the present application, the electrical connections to the electrodes can be made from outside the gas channels. This is in contrast to the Kieser *et al.* patent where Figures 1 and 3 show the connections in the body of the reactor such that they would be exposed to the exhaust gases, which would create many problems including the risk that the connections would degrade in the presence of the gas.

The use of a single piece of dielectric material to surround the electrodes and for a dielectric barrier between them also minimizes the number of components in the reactor. This typically leads to cost benefits in the assembly of the reactor.

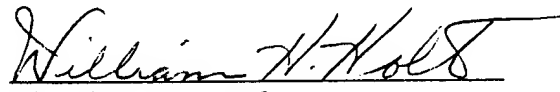
As all the remaining claims 50 to 67 depend on amended claim 48, these claims are also novel and inventive by virtue of their dependence.

The Commissioner is hereby authorized to charge any required fees associated with this communication and during the pendency

of the application under 37 CFR 1.16 and 37 CFR 1.17 or to credit any overpayment to Deposit Account No. 082670. This sheet is submitted in duplicate.

In view of the foregoing amendments and remarks, reconsideration of the application is requested and allowance of claims 48 and 50-67 is courteously solicited.

Respectfully submitted,



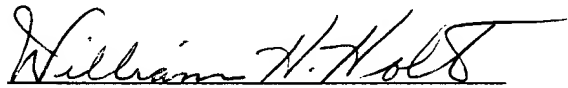
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